Vertical Sleeve Gastrectomy

By Margaret Rodriguez, CST, CFA, FAST

Aeger primo is the guiding principle under which surgical technologists and first assistants practice. Nothing exemplifies that very principle more than when the practitioner becomes the patient. There is an interesting dichotomy of feeling fully knowledgeable about a procedure, all its components and how well cases typically go, but simultaneously being completely unnerved by the awareness of all that can go wrong. On December 29, 2009 this author took that leap of faith that each and every one of her patients takes when undergoing a surgical procedure. In this article, the author documents the issues faced by bariatric patients in general and the technical components of her procedure in particular.

HISTORY

The May 2009, issue of *The Surgical Technologist* highlights an article by Karen L Chambers, CST, entitled "Obesity: An American Epidemic."[1] Identified by the Centers for Disease Control and Prevention (CDC) as the number-one health threat in the United States, obesity has come out of the proverbial closet and is now an issue that many people face, either for themselves or someone they know, and as a society that is at risk of reversing and reducing life-expectancy statistics.[2]

Chambers' article mentions vertical banded gastroplasty, also known as "stomach stapling," as a technique that has fallen out of favor since its development in the 1970s. There is a newer version of this procedure that is currently in use and is increasing in popularity called vertical sleeve gastrectomy (VSG). This surgical technique, though still considered somewhat investigational, was originally developed as a type of staging procedure for morbidly obese patients considered too ill or physiologically unstable to

LEARNING OBJECTIVES

- Review the selection criteria for this procedure
- Evaluate the procedural risks and complications of VSG
- Compare and contrast the different options for bariatric surgery
- Examine the step-by-step procedure of VSG
- Assess the risks and possible complications of the VSG procedure

undergo the Roux-en-Y gastric bypass. The vertical sleeve gastrectomy allowed for conversion to the gastric bypass at a later date when the patient had reduced their body mass index (BMI) and, by extension, their surgical risk.[3] Unlike banding procedures, VSG is permanent and irreversible.

SELECTION CRITERIA

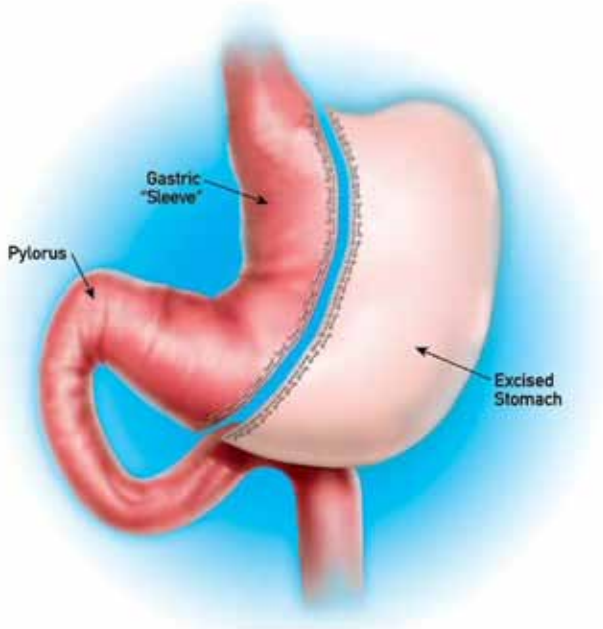
The vertical sleeve gastrectomy, in concept, is quite simple. It is a restrictive mechanical alteration in the digestive tract that actually removes up to 85-90 percent of the stomach, depending on the patient's needs and surgeon's discretion. No rerouting of the intestines takes place, as in gastric bypass, and no foreign bodies are implanted, as in banding procedures. The stomach is converted into a small, banana-shaped tube (sleeve) that changes neither the upper nor lower sphincters. The segment of the lesser curvature of the stomach that remains, between the esophageal sphincter and the pyloric sphincter, is more resistant to the stretching that the gastric body and fundus allow following ingestion of potentially-large amounts of food. For these and other reasons, vertical sleeve gastrectomy is gaining popularity and becoming an option of choice for patients who have a BMI less than 40.[4]

Comorbid conditions may become the factor that will allow a patient with a lower BMI to qualify for a bariatric procedure. Examples of comorbid conditions are prediabetes, diabetes, hypertension, dyslipidemia, sleep apnea, venous stasis disease, gastroesophageal reflux, and chronic joint pain or osteoarthritis. The severity of comorbid conditions is balanced against the individual patient's age and BMI to determine the appropriateness of bariatric surgical intervention.[5]

The presence of diseases considered comorbid to obesity are common and, in many cases, expected. Surgeons treating bariatric patients require extensive medical history information from patients and their primary care physicians (PCPs). A pattern of failed attempts at weight loss is considered one of the determining criteria for patients considering weight loss surgery. Some PCPs will begin a dialogue with their patients about the surgical options available to them, but a large number of patients initiate the process of information gathering on their own. Family practice or internal medicine physicians prescribe the tried and true "exercise, watch your diet and lose weight." The comorbid diseases that arise require medical treatment, so a regimen of prescriptions starts. Prescriptions carry risks of their own, and the rollercoaster ride starts for patients who suffer from medical problems that arise from the body's inability to manage extreme amounts of excess weight. The dosage of the drugs to treat comorbid conditions may have to be adjusted to higher levels because of the physiologic mechanisms of absorption and bioavailability in the obese patient.

Patients with conditions such as inflammatory bowel disease, or who have had previous intestinal procedures, as well as smokers and those on anticoagulation medications may be better candidates for VSG than for bypass. Sleeve gastrectomy is contraindicated in patients with a history of gastric cancer. Patients with a large hiatal hernia with severe gastroesophageal reflux disease (GERD) require either simultaneous or prior repair due to the alteration of the stomach anatomy.

A barrier to selection of VSG as an option is its relatively new status as an in-between option in bariatric surgery. Surgeons and insurance carriers in the United States favor the better-known gastric bypass and band procedures. There are longer-term outcomes data in the literature and years of surgeons' experiential histories and skill base. According to *www.laparoscopy.com,* there is no surgical procedure code (CPT) at this time for the vertical sleeve gastrectomy. Patients who have the ability to self-pay may opt for the VSG, but must be aware that they will be responsible for all costs incurred if there are postoperative complications requiring additional surgery. Insurance-covered gastric bypass and banding procedures have higher incidence of



A basic illustration of the VSG procedure.

re-operation. The current cost of the VSG at the Cleveland Clinic is approximately $19,000, making it slightly more expensive than laparoscopic banding, but with less likelihood of requiring any further surgical intervention.[6]

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PROCEDURAL RISKS AND COMPLICATIONS

Laparoscopic VSG shares all of the same risks of any other laparoscopic procedure. Among surgeons who perform bariatric procedures, there is debate and cautionary tales regarding sleeve gastrectomy. Jeffery L Lord, MD, director of MIS and bariatrics at the Sacred Heart Institute of Surgical Weight Loss in Pensacola, Florida, and chairman of the professional liability committee of the American Society for Metabolic and Bariatric Surgery has expressed concerns over the rise in popularity of VSG and its use in lower-BMI patients.[6]

His particular concerns involve the possible complications of a leak at the esophageal-gastric junction during sleeve gastrectomy, the learning curve of surgeons, and their capacity to deal with treating those leaks. He has seen postoperative complications requiring secondary operations to treat leaks resulting in pleural effusion, sepsis, wound infections and fistulas. Dr Lord fears the rise in the percentage of leakage complications corresponds with the rapid increase of VSGs performed. He states, "To have someone with minimal comorbidities get a sleeve because it's a new, 'gee-whiz' option? I think that's a bad choice. We don't even know what five or 10-year data shows on it." Surgeons do agree that regardless of the choice of surgical option for bariatric patients, there should be a multidisciplinary approach taken, surgeons should be proctored and monitored, and procedures should be performed in specialized centers of excellence.[6]

PREOPERATIVE PATIENT PREPARATION

Bariatric patients are required to complete several screening processes to assess their physical and physiological status as well as their psychological stability. The routine blood chemistries: H&H (hemoglobin and hematocrit); bleeding times (PT, PTT); comprehensive metabolic panel including: blood urea nitrogen (BUN), creatinine, eGFR, sodium, potassium, chloride, carbon dioxide, calcium, total protein, albumin, globulin, albumin/globulin ratio, total bilirubin, alkaline phosphatase, AST and ALT are performed to assess liver and kidney function and potential risks of hemorrhage from long-term use of anti-inflammatory drugs for chronic joint pain. A serum pregnancy test is performed on any pre-menopausal female patients. Routine urinalysis is also done to rule out potential urinary tract infection. A barium swallow radiology study is ordered to determine if there are any problems with the esophagus and sphincter or swallowing reflexes. It is not uncommon for morbidly obese patients to suffer from gastroesophageal reflux disease (GERD) and less-common problems with erosion or distention of the esophagus or gastric ulcers. Surgeons must decide, based on the individual patient, what the size of the sleeve should ultimately be, but they must first discover from the barium swallow if there will be potential problems with compatibility of the two structures' lumen size. In addition to the upper GI X-ray, a pre-operative chest X-ray may also be taken to rule out abnormalities in patients with a history of cardiac or pulmonary disease.[7] In patients without such history, pre-operative chest X-rays are seldom performed. In many cases, an electrocardiogram is done preoperatively. Hypertension is one of the most common comorbid conditions and the stress of excess weight, increased cholesterol and triglycerides, all contribute to potential cardiac instability during laparoscopic bariatric procedures.

Preoperative education with a nutritionist is required for patients who will be permanently changing their relationship with food. Every form of bariatric surgery, permanent or not, can fail if patients are unable, unwilling or ill-prepared to comply with dietary guidelines. The patient is taught to take the time to read product labels and focus on carbohydrates, fat and protein contained in food items. The goal is for patients to take in 64 ounces of water to maintain hydration and help with the feeling of satiety. Muscle tone and collagen in tissues require protein, and the need for protein is enhanced due to the greatly-reduced dietary intake. Patients are given tips on how to increase the amount of protein in their diets, both in foods long-term

The VSG "sleeve."

and in the more immediate postoperative recovery period in the form of protein drinks and shakes. It is recommended that patients begin the protein drinks preoperatively as part of a preoperative liquid diet designed to detoxify and reduce the size of the liver. In the sleeve gastrectomy, intraoperative complications of liver or spleen laceration are possible, especially if the liver is particularly large from a fatty food diet and/or excessive alcohol intake. Sipping of very small amounts (one ounce increments or less) of liquids is stressed in order to prepare the patient for the postoperative change in intake capacity. Sipping also reduces the problem of swallowed air that will cause gastric distention and discomfort. Carbonated drinks will become a thing of the past due to the same problems with gas/air bubbles. Typically, sodas are high in calories and are of little or no nutritional value, so they are placed on the list of restricted items. Caffeine and alcohol are restricted both preoperatively and postoperatively. Caffeine has a diuretic effect and patients must avoid potential dehydration. In VSG, there is no change in the absorption of food or nutrients, but alcohol has a high calorie count and may be more readily metabolized due to the decreased size of the stomach and time spent there. Foods that are highly processed or fried are also put on the restricted list. Overall, the "common sense" dietary guidelines are stressed and reinforced.

Bariatric surgery is only as successful as the patient's commitment to changing his or her lifestyle—forever. Additionally, a psychiatrist screens patients to determine their understanding of the process, the expected outcomes and, most importantly, the responsibility for compliance. If a potential candidate has the misguided view that the surgical procedure itself is the deciding factor in his or her overall success and that he or she has no real requirement to alter daily habits, then that patient may not be cleared for surgery. A personality profile is also administered to identify potential psychological pitfalls and misunderstandings. If a patient places undue emphasis on the superficial benefits of weight loss or expresses unrealistic goals or results from the procedure, red flags of caution are raised.

Support from family and friends is extremely important for bariatric patients who may have bouts of uncertainty beforehand and need for reaffirmation of their efforts afterwards. It is not just the patient who has to change his or her relationship with food; family members and friends need to take care not to undermine success by pushing someone to eat more, just because they perceive the dietary change to be too drastic, compared to before surgery.

PROCEDURAL STEPS

Editor's Note: *There may be variations in sequencing due to surgeons' preferences and training, individual patients' anatomy and physiology, and potentially unanticipated events. The following procedural steps are based on one patient's operative note, as dictated, as well as the author's personal research, including accessing the website OR Live.*[8]

The patient is given an intravenous antibiotic for infection prophylaxis. A preoperative enoxaparin sodium injection and bilateral calf-compression devices are used for deep vein thrombosis (DVT) prophylaxis. General anesthesia is administered via endotracheal intubation with the patient in the supine position. The abdomen is prepped with

betadine soap and paint (depending on surgeon's preference and patient's allergy status) from nipple line to upper thighs, laterally bedside to bedside and draped with towels for squaring off the operative area and a large fenestrated laparoscopy sheet with armboard covers and instrument pouches attached.

A 12 mm supraumbilical, off-midline incision is made through the epidermis, dermis and subcutaneous tissues. A 12 mm trocar is placed into the peritoneal cavity under direct visualization and intraabdominal pressure of 15 mmHg is created using carbon dioxide pneumoperitoneum. A 10 mm, 30-degree laparoscope is then placed through the trocar cannula.

Omental adhesions around the umbilicus, secondary to a previous laparoscopic cholecystectomy are lysed. The liver and stomach are visualized and appear normal. Two additional 12 mm trocars are placed at the right and left midabdominal, and two 5 mm trocars are placed at the upper right quadrant epigastric and the left subcostal.

A retractor is inserted through the epigastric port to elevate the left lobe of the liver, securing the diaphragmatic hiatus and exposing the angle of His, which is opened with electrosurgery. A measurement is taken from the pylorus about five cm along the greater curve. The greater curve is marked with the electrosurgery instrument and the greater omentum is opened. The surgeon enters the lesser sac with an ultrasonic scalpel. The greater omentum is divided off of the greater curve of the stomach and the short gastric vessels are divided, moving cranially toward the left crus. The left crus is then fully mobilized with the ultrasonic scalpel. The anterior and posterior leaflets of the gastrosplenic ligament is divided and the gastrocolic ligament is divided towards the pylorus. This allows complete mobilization of the greater curve of the stomach.

A 60 mm surgical stapler with the green staple cartridge and the buttress seam guard material is fired, partially stapling across the stomach approximately five cm from the pylorus towards the angle of the incisura. A 34-Fr Bougie dilator is passed into the esophagus and stomach, along the lesser curve of the stomach towards the pylorus. A partial gastrectomy is performed with the 34-Fr calibration tube in place with multiple firings of the stapler with the green staple cartridge, using the buttress seam guard material along the Bougie, creating the sleeve gastrectomy. The last two staple firings are done using the blue staple cartridge at the fundus.

After a complete resection of the lateral aspect of the stomach, the staple line is examined for leaks. In this case, it appears intact with no staple line disruption. A small bowel clamp is placed just distal to the ligament of Treitz. An intraoperative upper GI endoscopy is performed, demonstrating an appropriate-sized sleeve gastrectomy without intraluminal hemorrhage. No evidence of air leakage is seen with the sleeve submerged in saline and hemostasis is also achieved and demonstrated. At this point, the endoscope is withdrawn from the stomach sleeve, the small bowel clamp is removed and the GI endoscope is withdrawn from the stomach and esophagus. The surgeon noted a small hiatal hernia.

Following the removal of the endoscope, irrigation is clear and evacuated and hemostasis is once again achieved. A fibrin tissue sealant is placed along the staple line, which again appears intact. The left midabdominal 15 mm trocar is then removed and the trocar site is expanded and dialated to 24-Fr diameter. The resected portion of the stomach is extracted through the dilated trocar site from the abdominal cavity and sent to pathology for permanent section.

The fascial defect of the dilated left midabdominal incision is closed with 0 polyglactin 910, using the Carter-Thompson device. The wound is thoroughly irrigated with triple-antibiotic solution consisting of neomycin, polymyxin and bacitracin,[9] and a 19 Fr drain is placed along the gastric sleeve staple line and brought out through the upper right quadrant trocar site and secured with a 2-0 silk suture on a 3/8 circle cutting needle.

All other trocars are removed under direct visualization and no evidence of hemorrhage from the trocar sites

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is noted. The remaining carbon dioxide insufflations gas is released. Fascial sutures are secured and all wounds are irrigated with triple-antibiotic solution. All skin incisions are closed with 4-0 polyglactin 910 in subcuticular fashion. A skin adhesive is applied as skin closure and dressing. The counts are performed and determined to be correct. The patient is then awakened, extubated, transferred to a transport stretcher and taken to the PACU in stable condition.

Some patients are given patient-controlled analgesia (PCA) and usually remain overnight in the hospital. Prior to discharge on the first postoperative day, a Gastrografin swallow radiographic study is performed to assess sleeve status and rule out leaks or obstruction.

ABOUT THE AUTHOR

Margaret Rodriguez, CST, CFA, FAST, currently sits on AST's Board of Directors as vice president. She is also vice-chair of the Council on Surgical & Perioperative Safety. Ms Rodriguez lives in El Paso, Texas, and has been an AST member since 1992.

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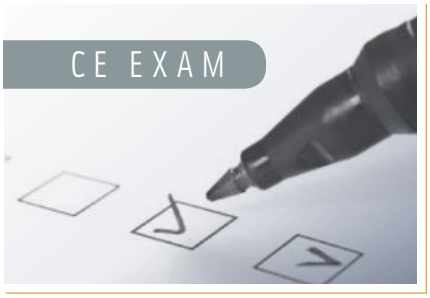

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